

Community structure of the macrozoobenthos and demersal fish in the Belgian North Sea

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Since the ocean is of major importance for human activities, research specifically focussing on marine ecosystems is needed. In the area of the North Sea a lot of coastal and oceanographic research has already been conducted on the impact of fisheries, eutrophication, sediment extractions, as well as pollution by trace metals and polychlorobiphenyls. The aim of this study is to investigate the community structure of the macrozoobenthos and demersal fish on the one hand, and to identify relationships between environment factors or anthropogenic impacts on the other hand. This is of importance, because the macrozoobenthos and demersal fish communities of the North Sea are a very important bioindicators (Callaway et al. 2002).

Samples of macrozoobenthos and demersal fish were taken with the RV Simon Stevin at three different stations (230, ZG03, and 120) in the Belgian North Sea using a beam trawl. All three stations were similar concerning the salinity (station 120: 33.4 p.s.u; station 230: 32.3 p.s.u; station ZG03: 32.6 p.s.u.) and granulometry (125-250 Mm; Danis et al. 2004). Station 120 and 230 (+/- 11.5 m) had the same depth, while station ZG03 was deeper (18.6 m). Sampling have been done in 2011 (230 (2 replicates), 120 and ZG03), 2012 (230 (2 replicates), 120 and ZG03), 2014 (230 (2 replicates), 120 and ZG03) and in 2015 (230 (3 replicates), ZG03, and Ostend (2 replicates). After the beam trawling was finished the samples were examined on board of the ship. The organisms were identified and the number and weight of individuals was recorded.

The Shannon diversity index (H) is low, which might indicate habitat degradation or environmental pollution. The Pielou index is below 0.5, which means that the different species are not equally abundant and that some species dominate the community.

A multivariate analysis has been conducted using the Bray-Curtis similarity between the different samples and a cluster analysis. Stations 120 and ZG03 are usually clustered together in the dendrogramme. The metal and polychlorobiphenyl concentrations are the highest in station 120 (Danis et al. 2004), which is the closest to the coast. Station ZG03 is located close to areas of sand extraction, which could have a big influence on the benthic community.

References

- Callaway R., J. Alsvåg, I. de Boois, J. Cotter, A. Ford, H. Hinz, S. Jennings, I. Kröncke, J. Lancaster, G. Piet, P. Prince, and S. Ehrich (2002) Diversity and community structure of epibenthic invertebrates and fish in the North Sea. ICES Journal of Marine Science, 59: 1199- 2114
- Danis B., P. Wantier, S. Dutrieux, R. Flammang, Ph. Dubois, M. Warnau (2004) Contaminant levels in sediments and asteroids (*Asterias rubens* L., Echinodermata) from the Belgian coast and Scheldt estuary: polychlorinated biphenyls and heavy metals. Science of the Total Environment, 333: 149-165
- Piet, G. J. and Rijnsdorp, A. D. (1998) Changes in the demersal fish assemblage in the south- eastern North Sea following the establishment of a protected area ("plaice box"). ICES Journal of Marine Science, 55: 420-429
- Piet, G. J., van Hal, R., and Greenstreet, S. P. R. (2009) Modelling the direct impact of bottom trawling on the North Sea fish community to derive estimates of fishing mortality for non- target fish species. ICES Journal of Marine Science, 66: 1985-1998
- Reiss, H., Degraer, S., Duineveld, G. C. A., Kröncke, I., Aldridge, J., Craeymeersch, J., Eggleton, J. D., Hillewaert, H., Lavaleye, M. S. S., Moll, A., Pohlmann, T., Rachor, E., Robertson, M., vanden Berghe, E., van Hoey, G., and Rees, H. L. (2010) Spatial patterns of infauna, epifauna, and demersal fish communities in the North Sea. ICES Journal of Marine Science, 67: 278-293

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